

WHAT IS CLAIMED IS:

1. An image forming apparatus comprising:
an image forming unit which forms an image on one surface
5 of a printing medium;
a platen;
a transporting device which transports the printing
medium in a transportation direction along the platen while
the other surface of the printing medium faces a surface of
10 the platen; and
a suction device which sucks air, wherein:
the platen includes:
a plurality of rollers which are rotatable around
rotation axes perpendicular to the transportation
15 direction and protrude from the surface of the platen;
and
a suction opening which is defined on the surface
of the platen and communicates with the suction device.
- 20 2. The image forming apparatus according to claim 1,
wherein at least a part of the rollers rotate independently
from each other.
- 25 3. The image forming apparatus according to claim 1,
wherein:

the platen further includes:

5 a plurality of rib portions which protrude from the surface of the platen, extend in parallel to the transportation direction, and are arranged in a direction perpendicular to the transportation direction at a predetermined interval; and

10 an air flow passage which is defined between the adjacent rib portions, extends in the transportation direction, and includes the suction opening; the rollers are disposed in at least one of the rib portions and the air flow passage; and

a part of each roller protrudes to be closer to a printing-medium side than each rib portion.

15 4. The image forming apparatus according to claim 3, wherein the air flow passages includes the suction opening on at least one of upstream and downstream, in the transportation direction, of an image forming area where the image forming unit forms the image.

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5. The image forming apparatus according to claim 3, wherein:

the platen further includes convex portions which extend in the direction perpendicular to the transportation direction, 25 are connected to or adjacent to at least the two adjacent rib

portions, and are disposed on upstream and downstream, in the transportation direction, of an image forming area where the image forming unit forms the image, respectively; and
the suction opening is defined at least in a predetermined
5 region in the vicinity of the convex portions.

6. The image forming apparatus according to claim 3,
wherein:

the image forming unit includes a recording head having
10 a nozzle face which faces the platen and ejects ink therefrom;
and

the suction opening is defined on at least one of upstream
and downstream, in the transportation direction, of a region
where the nozzle face faces the platen.

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7. The image forming apparatus according to claim 6,
further comprising:

a carriage which moves the recording head forward and
backward in a predetermined direction, wherein:

20 the suction opening is defined outside a region where
the carriage has the substantially same height as the nozzle
face of the recording head.

8. The image forming apparatus according to claim 3,
25 wherein:

the image forming unit includes a recording head having a nozzle face which faces the platen; and the suction opening is defined on at least one of upstream and downstream, in the transportation direction, of a region 5 where the recording head faces the platen.

9. The image forming apparatus according to claim 8, further comprising:
a carriage which moves the recording head forward and 10 backward in a predetermined direction, wherein:
the suction opening is defined outside a region where the carriage moves.

10. The image forming apparatus according to claim 7, 15 wherein air flowrate between the surface of the printing-medium carriage and the nozzle face is equal to or lower than 10 % of an ink ejection velocity.

11. The image forming apparatus according to claim 10, 20 wherein:
the roller has a radium equal to or larger than 4.3 mm;
and
a projection amount of the roller from an upper end of each rib portion is equal to or lower than 0.4 mm.

12. The image forming apparatus according to claim 8, wherein air flow rate between the surface of the printing-medium carriage and the nozzle face is equal to or lower than 10 % of an ink ejection velocity.

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13. The image forming apparatus according to claim 12, wherein:

the roller has a radium equal to or larger than 4.3 mm;
and

10 a projection amount of the roller from an upper end of each rib portion is equal to or lower than 0.4 mm.

14. The image forming apparatus according to claim 4, wherein:

15 the suction opening is a plurality of suction openings;
and

the air flow passages includes the suction openings on the upstream and downstream, in the transportation direction, of the image forming area,

20 the image forming apparatus further comprising:

an air chamber which communicates the suction openings on the upstream and downstream of the image forming area.

15. The image forming apparatus according to claim 14, 25 wherein a total area of the suction openings on the upstream

of the image forming area is equal to that on the downstream of the image forming area.

16. The image forming apparatus according to claim 3,
5 wherein the rollers are arranged in the transportation direction.

17. The image forming apparatus according to claim 16,
wherein the rollers are arranged at constant intervals in the
10 transportation direction.

18. The image forming apparatus according to claim 16,
wherein the rollers form a plurality of rows of the rollers.

15 19. The image forming apparatus according to claim 16,
wherein at least a part of the rollers are arranged symmetrically
with respect to a virtual line extending in the transportation
direction.

20 20. The image forming apparatus according to claim 3,
wherein:

the rollers form a plurality of rows of the rollers;
the rows of the rollers are arranged in the direction
perpendicular to the transportation direction at predetermined
25 intervals; and

the predetermined intervals widen as approaching from a center of the printing-medium carriage to an end portion the printing-medium carriage in the direction perpendicular to the transportation direction.

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21. The image forming apparatus according to claim 3, wherein the rib portions extend in the transportation direction continuously or not-continuously.

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22. The image forming apparatus according to claim 1, wherein the rollers are arranged in the transportation direction.

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23. The image forming apparatus according to claim 1,

wherein:

the rollers are arranged in the transportation direction;
and

the rollers form a plurality of rows of the rollers.

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24. The image forming apparatus according to claim 23, wherein the suction opening is defined on the surface of the platen and between the rows of the rollers.

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25. The image forming apparatus according to claim 1, wherein the suction opening is defined on the surface of the

platen and in the vicinity of at least one of the rollers.

26. The image forming apparatus according to claim 1,
wherein the suction opening is defined on the surface of the
5 platen and in the vicinity of an outside of the rollers in a
direction perpendicular to the transportation direction.

27. The image forming apparatus according to claim 1,
wherein at least a part of the rollers are disposed symmetrically
10 with respect to a predetermined line.

28. The image forming apparatus according to claim 27,
wherein a widening ratio of a width between the adjacent rollers
is smaller as approaching from a center of the printing-medium
15 carriage to an end portion the printing-medium carriage in the
direction perpendicular to the transportation direction.

29. The image forming apparatus according to claim 1,
the rollers are arranged at constant intervals in a direction
20 perpendicular to the transportation direction.

30. The image forming apparatus according to claim 1,
wherein:
each roller has a radium equal to or larger than 4.3 mm;
25 and

a projection amount of each roller from the surface of the platen is equal to or lower than 0.4 mm.

31. The image forming apparatus according to claim 1,
5 wherein:

the image forming unit includes a recording head;
a distance between the printing medium along the surface of the platen and the surface of the platen is equal to or lower than 1 mm; and

10 a projection amount of each roller from the surface of the platen is equal to or lower than 2 mm.

32. The image forming apparatus according to claim 1,
wherein a load which the printing medium applies to the rollers
15 is equal to or lower than 0.098 N.

33. The image forming apparatus according to claim 1,
wherein:

20 a flatness of the printing medium is equal to or lower than 0.1 mm, when the printing medium is in contact with the rollers;

the flatness of the printing medium is defined as
(average distribution negative pressure)

$$\times (\text{pitch between the rollers})^4 / (\text{Clark rigidity}).$$

34. The image forming apparatus according to claim 1,
wherein tops of the rollers are in a range of 0.1 mm.

35. The image forming apparatus according to claim 1,
5 the rollers are arranged at constant intervals in the
transportation direction.

36. The image forming apparatus according to claim 1,
further comprising:
10 bearing members for the rollers; and
a prevention member which prevents an image formation
agent from adhering to or approaching the bearing member of
at least one of the rollers.

15 37. The image forming apparatus according to claim 36,
wherein the prevention member includes a projection portion
which projects from the at least one of the rollers in a rotation
radius direction.

20 38. The image forming apparatus according to claim 37,
wherein the at least one of the rollers and the projection portion
are formed integrally.

39. The image forming apparatus according to claim 36,
25 wherein:

the prevention member includes:

a first projection portion which projects from the at least one of the rollers in a rotation radius direction; and

5 a second projection portion from the at least one of the rollers, in parallel to the first projection portion.

40. The image forming apparatus according to claim 39,
10 wherein the at least one of the rollers, the first projection portion, and the second projection portion are formed integrally.

41. The image forming apparatus according to claim 36,
15 wherein the prevention member includes a projection portion which is integrally formed with the platen and projects from the platen.

42. A platen comprising:
20 a plurality of rib portions which protrude from a surface of the platen, extend in parallel to a transportation direction of a printing medium, and are arranged in a direction perpendicular to the transportation direction at a predetermined interval;

25 an air flow passage which is defined between the adjacent

rib portions, and extends in the transportation direction;
a plurality of rollers which are disposed in at least
one of the rib portions and the air flow passage; and
a suction opening which is defined on the surface of the
5 platen in the air flow passage, wherein:
a part of each roller protrudes to be closer to a
printing-medium side than each rib portion.

43. The platen according to claim 42, wherein the rib
10 portions extend in the transportation direction continuously
or not-continuously.